# Command and Table Load Editor

ITOS Edition

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# Command and Table Load Editor

### 1 Load Editor Overview

The command/table load editor is designed to facilatate the quick generation of command and table loads via a graphical user interface. To build command loads the user can select commands from a scrolling list of commands and build groups of commands called activities. These activities are then time tagged and then a command load file is then generated. This command load file can then be sent to the spacecraft via the STOL directive /LOAD. This tool does not provide any checks and balances and will allow any command to be placed in the load no matter how critical so care should be taken.

To build table loads and view table dumps the load editor provides a tool to define how an onboard table looks like and then fill in that table with data. Once the table is populated with data a table load file can be built. This load file can then be sent to the spacecraft using the STOL /LOAD directive. Using the same table definition, table dumps can be viewed with each element of the table displayed in a readable format.

There must be an leditor.dat file in your home directory in order to run the Load Editor.

The Load Editor is available on the main stol window's "progs" button. Click on this button to bring up a menu which will have the load editor on it. Choose the load editor to bring up the load editor's main panel (shown below).



When the user selects the load editor from the programs menu a panel containing several buttons will appear on the screen. The user can exit the Load Editor program by pulling down the window menu and selecting the exit option. The user can select any of the seven options on the main panel to bring up more windows which will allow them to define, build or view loads.

The loads that are created are written to the /loads directory for the mission that they were built for (i.e. "swas/loads or "fast/loads).

### 2 leditor.dat file

The "leditor.dat" file is an ascii text file that contains configuration parameters needed by the leditor program. This file should be located in the current directory or in the "/home/ITOS\_GROUP" directory. The format for the file is a list of "name=value" inputs for each mission you need supported by this file. Most likely you will need just one set of inputs. If you do need another set of inputs use a ";" on a line by itself to separate the sets.

The name=value inputs are:

mission=<mission name>
ing this load for

The name of the mission you are build-

such as wire, swift, etc.

checksum\_bytes=<number of bytes>
sum at the end of each

This is the number of bytes that the check-

command contains. 1, 2, 4 etc. Usu-

ally 2.

checksum\_start\_byte=<byte number>
mand packet header

At what byte relative to the start of the com-

do we start checksumming? Usually 0 which is th command packet header.

pkt\_secondary\_hdr=<yes or no>

Is there a command packet secondary header? Yes

pkt\_secondary\_hdr\_length=<number of bytes> This is the number of bytes in the secondary header. 1, 2, etc.

Usually 2.

max\_ats\_bytes=<number of bytes>
tain. If this

This is the maximum size in bytes that an ATS 1

size is exceeded then a warning mes-

sage is output in the integrated print

but the load will still be gener-

ated. If you don't know this value make it

something big such as 100000.

max\_rts\_bytes=<number of bytes>
tain. If this

size is exceeded then a warning mes-

sage is output when the load is generated

but the load will still be gener-

ated. If you don't know this value make it

something big such as 100000.

timetag\_type=<data type>

The destination data type of the ATS time tags. at this time. This is the timetag that pre-

This is the maximum size in bytes that an RTS 1

cedes each command in the command

load.

command\_number=<yes or no> ceded by a command number? Yes or no. Are the commands in the load pre-

Normally yes.

timestamp=<yes or no> tire load? Yes or no.

Is there a timestamp preceding the en-

select\_command=<command mnemonic> This is the name of the select command mnemonic i.e. SMTBLSELECT, NOSELECT.

select\_id\_fieldname=<field mnemonic> ble id to i.e TABLEID, ID.

This is the name of the field to set the ta-

ble id value to this field mnemonic to

The leditor program will add the ta-

end up with something like: TABLEID=64

select\_source\_value=<submnemonic> lect command?

What is the value of the source field for the s

This is a submnemonic value such as SR-

CZERO, SRCRAM, etc.

This input is optional.

select\_destination\_value=<submnemonic> What is the value of the destina-

tion field for the select command?

This is a submnemonic value such as DE-

STRAM, DESTROM, etc.

This input is optional.

load\_command=<command mnemonic> BLLOAD, NOLOAD.

What is the name of the table load mnemonic? i.

set value to? i.e. OFFSET. The leditor program will add the off-

load\_offset\_fieldname=<field mnemonic> What is the name of the field that we set the o

set value to this field mnemonic to end

up with something like: OFFSET=0 This input is optional.

commit\_command=<command mnemonic> What is the name of the commit command mnemonic? i.e. SMTBLCOMMIT, NOCOMMIT.

commit\_checksum=<yes or no> mit command? Yes or no.

Do you want a "checksum=value" added to the com

The leditor program will calculate a check-

sum of the entire load and set the

checksum field specified by the commit\_checksum\_fieldname to the checksum value.

commit\_enable\_value=<submnemonic> able field? The commit

command normally has a checksum field that has

If checksumming is enabled what is the value fo

sociated submnemonics that enable

or disable checksumming i.e CKEN-

ABLE, CKDISABLE.

This input is optional.

commit\_checksum\_fieldname=<field mnemonic> If checksumming is enabled what is the fiel checksum value to? The led-

itor program will append the checksum value

to this field mnemonic to get some-

thing like: CHECKSUM=H'3D8E'

This input is optional if you are not send-

ing the checksum value with

the command.

An example leditor.dat file:

\_\_\_\_\_\_

mission=wire

checksum\_bytes=2 checksum\_start\_byte=0

pkt\_secondary\_hdr=yes

pkt\_secondary\_hdr\_length=2

max\_ats\_bytes=56000

max\_rts\_bytes=500

timetag\_type=TIME40

command\_number=yes

timestamp=yes

select\_command=SMTBLSELECT

select\_id\_fieldname=TABLEID

select\_source\_value=SRCZERO

select\_destination\_value=DESTRAM

load\_command=SMTBLLOAD

load\_offset\_fieldname=OFFSET

commit\_command=SMTBLCOMMIT

commit\_checksum=yes

commit\_enable\_value=CKENABLE

commit\_checksum\_fieldname=CHECKSUM

The above configuration file will produce a load file that looks like the following:

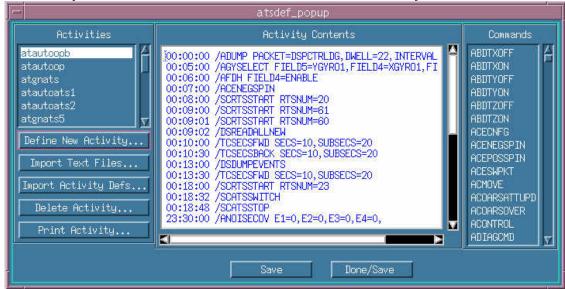
ATS Load

WIRE, ATSA, 2004-302:14:28:12,001, I&T, 00C8, NOSWAP

```
/SMTBLSELECT TABLEID=64, SRCZERO, DESTRAM
/SMTBLLOAD OFFSET=H'0'
/SMTBLCOMMIT CKENABLE, CHECKSUM=H'B38'
;
;----The following Commands are in this Load---
;2004 302 00:00:00 /TCTIMEJAM GMT=01-352-20:35:00.44
;2004 302 00:00:01 /TCRESET
;
X4544BA7C ; Timestamp
;
;Cmd# Time ApID Seq Len FC Data CK
X0001 4543EF00 1807 C000 0009 0001 3F2588F470A3 03DC;
;
;Cmd# Time ApID Seq Len FC CK
X0002 4543EF01 1807 C000 0003 0004 00E6;
;
```

### 3 Define ATS command loads

To create ATS loads you must first define the input to the loads by choosing the Define ATS Activity button. The main window of the Define ATS Activity section is shown below.



To define a new ATS definition select the Define New Activity button.

A window will appear asking to Enter ATS Name. Place the mouse on the blank line and type the name that you wish call the ATS definition. You can call the definition anything you want as long as there is not another ATS definition with the same name. Then press accept. If the name is accepted then the new name of the definition will then appear on the activities list. If the name already exists then you will be prompted to enter another name. If you really want to call it by a name that already exists then you will have to delete the existing activity.

Click on the new name in the activities list and then click on the blank Activity Contents window. A cursor will appear and you may begin entering commands in the form:

```
HH:MM:SS /CMD1 SUB1=100,SUB2
HH:MM:SS /CMD2 SUB2=20.0
HH:MM:SS /CMD3
```

Make sure that there is a space between the time and the commands and that commas seperate subcommands.

You may also define commands interactively by selecting commands from the Commands Scrolling List. First select a command from the list. If a message appears saying "You must first select an ATS definition" you must click on one of the definitions in the activities list before continuing. If the command you have selected has no submnemonics associated with it then a Time Offset window will popup. Enter hours minutes and seconds for the offset time and click on the Insert Command button when you are finished.

If there are submnemonics associated with the command selected then a window containing the submnemonics will appear. Select only one submnemonic from each group. If the submnemonic is a variable submnemonic it will be followed by an equal sign and a

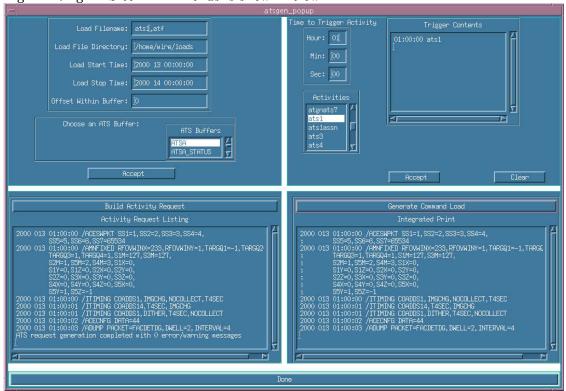
text field. The range for the submnemonic value will appear after the text field. Enter the value for the submnemonic in the text field. You may enter integer values in decimal or hex (i.e. 255 or 0xFF). Real values can be entered in exponential or decimal. If the value is out of range it will tell you when you press return or press the "Accept Input" button. If the value is acceptable then no messages will appear. A Time Offset frame appears above the submnemonics. Enter hours, minutes and seconds for the offset time and click on the "Accept Input" button when you are finished.

You may also import text files into the definition by using the Import Text Files function. A file manager widget will popup. Just select a file and it will be placed into the activity where the cursor is located.

When you are finished defining the ATS then click on the SAVE button. You may then define another ATS or exit the window by pressing the "Done/Save" button. If you want to exit this window without saving anything then dismiss the window without saving.

### 4 Generate ATS command loads

To Generate the ATS load file select the Generate ATS Load button from the main menu. This will bring up a frame for generating the actual ATS load. The main window for generating ATS command loads is shown below.



First enter information in the upper left section of the display. There are already some default values in these fields. If you enter a filename that already exists in the load file directory then it will be over written. You may make the filename and load file directory any valid filename and existing directory.

Next enter a start and stop time for the ATS load in the format: YYYY DDD HH:MM:SS (i.e. 1993 122 00:00:00). It defaults the current day and following day. This value will tag the commands with the date entered. For example if there is a command in the activity that reads 10:00:02 /SNOOP it will be adjusted to read 1993 122 10:00:02 /SNOOP.

Next enter a starting address for the load within the ATS table selected. The default is 0. Then choose the ATS buffer that you want the ATS to be loaded onto from the ATS Buffers list. Select the "Accept" button when you are finished. If there are any errors in your input you will be prompted to fix them before you can continue. When all inputs are correct a message stating "Input Accepted" will appear.

Next go to the upper right portion of this window. This is a Trigger ATS window. First enter the time offset from the start of the ATS sequence that you want the ATS definition to start in hours, minutes, and seconds. For instance you may want one ATS definition to start at ten minutes after the ATS start time and another ATS definition to start at three hours and ten minutes after the ATS start time. So you would enter:

Hour: 00 Min: 10 Sec: 00

and then select the ATS definition from the ATS Activity list. Normally just one activity is selected to be triggered. When finished select the "Accept" button. If everything is ok a message will popup telling you so.

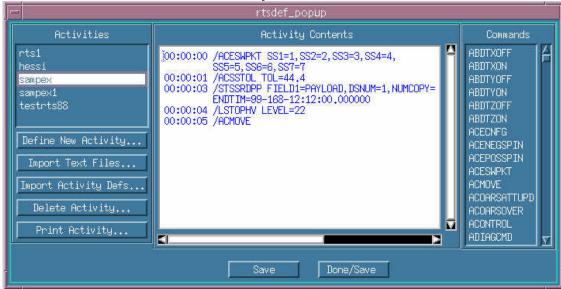
Next go to the lower left part of this window to build the activities request. It will perform syntax checking on the ATS definition. If there are any errors they will appear at the bottom of the generated list.

Next select the Generate Command Load button which will build the load and write it to a file.

Press the "Done" button when finished.

### 5 Define RTS command loads

To create RTS loads you must first define the input to the loads by choosing the Define RTS button. The main define RTS activity window is shown below.



To define a new RTS definition select the Define New RTS button.

A window will appear asking to Enter RTS Name. Place the mouse on the blank line and type the name that you wish call the RTS definition. You can call the definition anything you want as long as there is not another RTS definition with the same name. Then press "accept". If the name is accepted then the new name of the definition will then appear on the activities list. If the name already exists then you will be prompted to enter another name. If you really want to call it by a name that already exists then you will have to delete the existing activity.

Click on the new name in the activities list and then click on the blank Definition window. A cursor will appear and you may begin entering commands in the form:

```
HH:MM:SS /CMD1 SUB1=100,SUB2
HH:MM:SS /CMD2 SUB2=20.0
HH:MM:SS /CMD3
```

Make sure that the commands are in caps and that there is a space between the time and the commands and that commas separate the subcommands.

You may also define commands interactively by selecting commands from the Commands Scrolling List. First select a command from the list. If a message appears saying "You must first select an RTS definition" you must click on one of the definitions in the activities list before continuing. If the command you have selected has no submnemonics associated with it then a Time Offset window will popup. Enter hours minutes and seconds for the offset time and click on the Insert Command button when you are finished.

If there are submnemonics associated with the command selected then a window containing the submnemonics will appear. Select only one submnemonic from each group. If the submnemonic is a variable submnemonic it will be followed by an equal sign and a

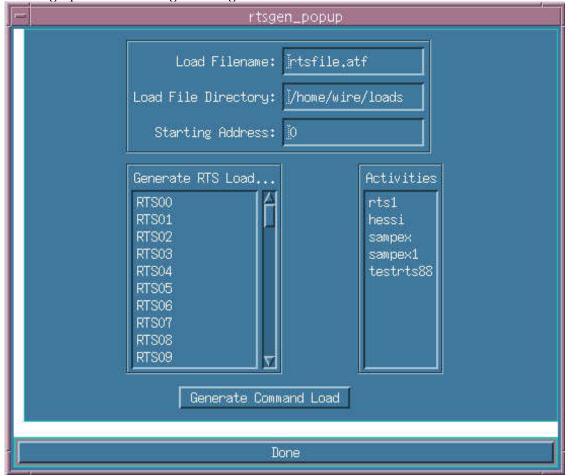
text field. The range for the submnemonic value will appear after the text field. Enter the value for the submnemonic in the text field. You may enter integer values in decimal or hex (i.e. 255 or 0xFF). Real values can be entered in exponential or decimal. If the value is out of range it will tell you when you press return or press the "Accept Input" button. If the value is acceptable then no messages will appear. A Time Offset frame appears above the submnemonics. Enter hours, minutes and seconds for the offset time and click on the "Accept Input" button when you are finished.

You may also import text files into the definition by using the Import Text Files function. A file manager widget will popup. Just select a file and it will be placed into the activity where the cursor is located.

When you are finised defining the RTS then click on the SAVE button. You may then define another RTS or exit the window by pressing the "Done/Save" button. If you want to exit this window without saving anything then dismiss the window without saving.

### 6 Generate RTS command loads

To build an RTS load file select Generate RTS Load button from the main menu. This will bring up a window for generating the actual RTS load. This window is shown below.



First enter values for filename, directory and starting address. There are already some default values in these fields. If you enter a filename that already exists in the load file directory then it will be over written. You may make the filename and load file directory any valid filename and existing directory.

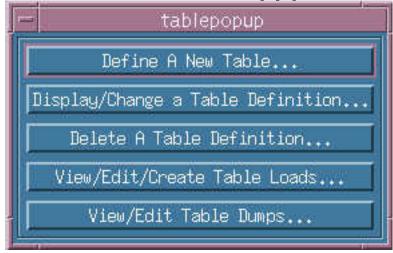
Next select the RTS buffer that the RTS load will be loaded onto from the list of available RTS buffers. Then select from a list of defined RTS activities which activity you wish to go into the load.

Now you can select the Generate RTS Load button which will build the load and write it to a file. If there are any invalid commands in the load a window will popup showing you which ones were invalid.

Dismiss the RTS generation window by pressing the "DONE" button.

## 7 Table Loads

To start the Table Load Editor select the "Table Load/Dump" button from the main Load Editor window. The main Table Load menu will popup.



The Table Load/Dump portion of the Load Editor will allow the user to:

#### 7.1 Define a New Table

Select the "Define A New Table" button on the menu to create a new table definition. The first window that pops up will ask for general information about the table. This window is shown below.



Name of Table: - any alphanumeric description of the table up to 40 characters Table ID#: - the actual table id of the table.

Starting Byte in Packet: - offset in the table where you want the data to start. 0 byt Number of Elements in Table: - how many separate data elements in the table (as in a telemetry packet).

Swap Data Field: - does the data have to be swapped when loaded on the spacecraft? (usually not) Value can be SWAP or NOSWAP.

Once this data is entered select the "Accept Input" button to continue to the next step where each element in the table will be defined. Select the "Cancel" button to dismiss this function.

When the "Accept Input" button is selected the data input into the text fields is validated. If there are any errors in the input a message will popup stating what the error is. Once all the inputs are valid a window will popup displaying the elements of the table. An example of this window is shown below.



If 4 elements were input on the table definition window there should be 4 rows of text fields displayed on this window. These fields must be filled in to describe each element of the table. Discribing these elements is much like describing mnemonics in a telemetry packet. The parameters of each element in the table are as follows:

```
Field Name: - any alphanumeric string up to 40 characters
TLM Mnemonic: - uses this telemetry mnemonic's conversion when display-
ing it's value
Data Type: - data type of element (U1, U1234, F1234, F12345678, etc.)
Array Size: - you don't need to define 100 U1 elements, just set array size to 100
Start Bit: - at what bit the data starts within the data type.
```

Length: - length in bits of the data within the data type.

Default: - when a table is generated the value of the element will default to this val Low Range: - minimum value the element can have.

High Range: - maximum value the element can have.

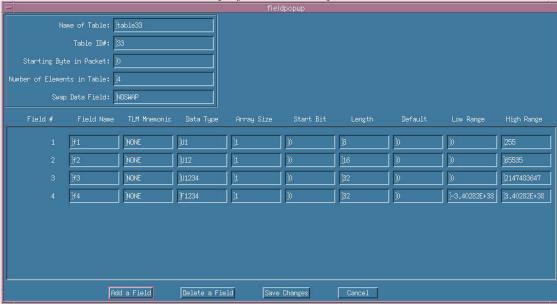
An example of a completed table elements window is shown below.



When you are finished completing the table definition select the "Save" button to save the table definition. Select "Cancel" to dismiss the table element window. Select the "Cancel" button on the table definition window to dismiss that window.

### 7.2 Display/Change a Table Definition

To display an already defined table definition select the "Display/Change a Table Definition" button on the table popup window. A list of already defined tables will popup. Select the table from the list that you wish edit/view. A window combining the table and table element definitions will be displayed. An example of this window is shown below.



From this window you can change any parameter shown in a text field. To add/insert another field into a table select the "Add a Field" button. This will popup a blank field definition. Enter all the information for the field then enter a number that will represent the location relative to the other fields in the table. For example, if you have 4 fields in the table and you wish to add a field and place it in the 3rd position in the table enter 3 for the field number. This will insert the new field at the 3rd slot and push up the current 3 and 4 fields to the 4 and 5 fields.

To remove a field definition select the "Delete a Field" button. Enter the number of the field to delete and select the "Delete" button. The remaining fields will be adjusted.

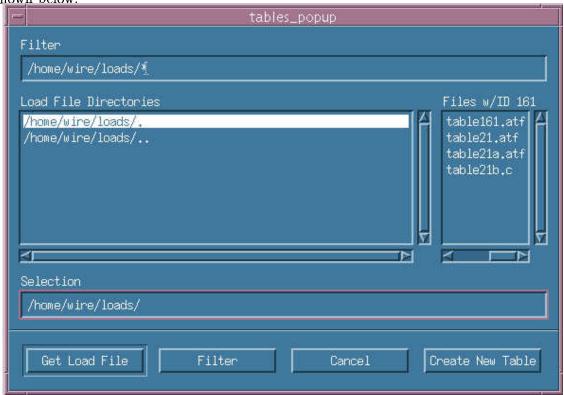
When finished making changes select the "Save Changes" button. Select the "Cancel" button to quit this window.

#### 7.3 Delete a Table Definition

This will allow the deletion of a complete table definition. Select the "Delete A Table Definition" button and a list of defined tables will appear. Select a name on this list to delete it. A window will popup asking you if you are sure you want to delete this table. Select "Delete" to finish the operation or "Cancel" to ignore.

### 7.4 View/Edit/Create Table Loads

To create a table load based on a predefined table definition select the "View/Edit/Create Table Loads" button. A list of defined tables will appear. Select the table that you wish to build from this list. Once you select a table a file manager will popup. This window is shown below.



If there are already tables that exist in the loads directory that have the same table id as the table that you wish to build they will be displayed in the list on the right. If you wish to display and/or edit the contents of a table in this list just select one of them. If you want to create a new table select the "Create a New Table" button. Selecting either a file or the "Create" button will display a template of the table definition with the values of

This is a display of the file table161.atf

Threshold for setting TripadValid Flag TRUE

Max difference between TriPAD and WAES zenith error signals (11.5 deg)

Max number of detected WAES error conditions before failure

Max positive excursion for zenith error signal for Y-RW control (8 deg)

Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

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Max number of detected Y-wheel error conditions before failure

Max number of detected Y-wheel error conditions before failure

Detection to leave the failure failure failure

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Detection to leave the failure failure failure failure

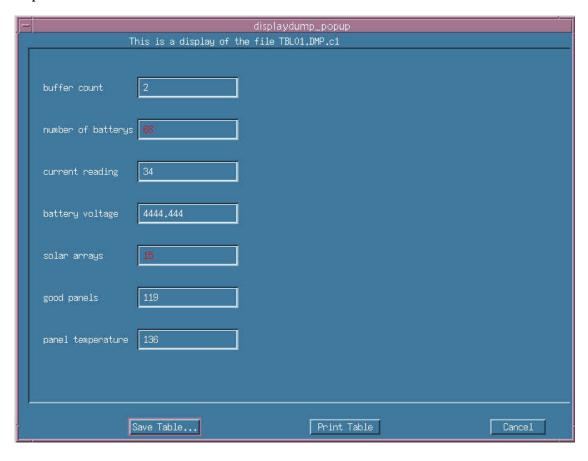
Detection to leave the failure failure

the table inserted into each field. These values will be default values if it is a new load or values extracted from the file you selected. An example of this window is shown below.

Once the table is displayed, changes can be made to the values of the fields and then the load can be saved by selecting the "Save Table" button. If there are any values out of range or not filled in an error message stating that fact will popup. If all the values are valid a file manager will popup which will allow the user to set the load file name and directory. Enter the filename in the Selection text field.

### 7.5 View/Edit Table Dumps

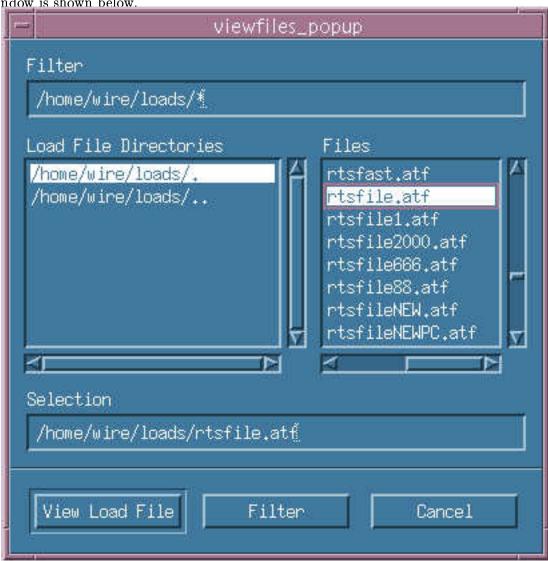
The table dump function of the load editor works the same as the table load function. The displays are exactly the same except the headers read dump not load. Select the "View/Edit Table Dumps" and a file manager will popup. In the file manager a list of dump files that reside in the mission table dump directory will be displayed. Select one of the dump files in this list and if a predefined definition of the table exists the table dump will be displayed in tabular form. If there is no definition for this table in the load editor then a message will be displayed stating that fact. Once the table dump is displayed the user can then edit the table dump and save it off as a table load to be sent back to the spacecraft. If any of the values in the table dump are out of range, as defined in the table definition, they will be displayed in red. An example of a table dump is shown below.



### 8 View Loads

To view the load file you just created select the View Loads button. The viewloads

window is shown below.



A window will appear with files listed on the right hand side. The directory that appears is the default mission loads directory. You may change it to any other directory. Click on one of the files to get it to appear in the text edit window. This window is shown below.

```
viewload_popup
                                        Contents of rtsfile.atf
RTS Load
WIRE, RTS04, 1999-330:18:17:25, 001, I&T, 0008, NOSWAP
/SMTBLSELECT TABLEID=4, SRCZÉRO, DESTRAM
/SMTBLLOAD OFFSET=H'O'
/SMTBLCOMMIT CKENABLE, CHECKSUM=H'5B7'
;----The following Commands are in this Load---;00:00:00 /TOTLMCONFIG RATE=TLM23K,FILTER_TBL=RT32K,OUTPUT=BIPHASE,VOLTAGE=1,
DL_SEQ=DSHIGH,ENCODER=ESHIGH;00:00:03 /SMIOREAD DATASIZE=DWORD,PORT=34;00:00:05 /PSTCCTRL SELECT=OFF
X3B44AF35 ; Timestamp
Time ApID Seq Len FC
                                          Data
X0000 1803 C000 0009 0002 010300010101 00ED;
;Time ApID Seq Len FC Data CK
X0003 1804 C000 0007 0005 00030022 010D;
                                                                                                            D
                                               Save Loadfile
                                                      Done
```

You can then view/edit the load if you wish to change things such as the starting address or change the /SMTBLCOMMIT command to /NOCOMMIT or change some data. When you are finished making changes select the "Save Loadfile" button to save the changes to the file and then dismiss the window when you are finished.

### 9 Set Working Directory

The load editor tool uses four different data files to store the definitions created while using the tool. The user need not worry about these files except that anything that they defined will be stored in these files such as with .doc files used in Word. These files are as follows:

```
atsfiles.data - contains the ATS command load definitions.
rtsfiles.data - contains the RTS command load definitions.
tablefields.data - contains spacecraft table definitions.
buildreqats.data - contains the latest ATS load filename and time range.
```

The "Set Working Directory" function will allow the user to point to the directory where the ".data" files that they want to use are located. The default directory is the mission home directory.